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Land Reforms Revisited: An Emerging Perspective on the Hellenic Land Administration Reform as a Wicked Policy Problem

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Abstract: This paper explores the complex nature of land reforms, arguing that they should be considered wicked policy problems by focusing on the Hellenic Land Administration Reform (HLAR). The article reflects on recent contributions that argue that the HLAR's challenges are associated with the great leap forward shift from a French-influenced deed paper-based system to a German-influenced digital cadastral parcel-based system. Another recent study contended that the legislative overregulation during the sovereign crisis period in the organizations of the diverse land registry systems of the land administration policy domain further complexified the reform process. A lack of consensus on the reform's main policy thrust and the means to achieve it was present both at the onset of the reform and during the economic crisis period, among the actors in the reform process. This paper contributes to the contemporary scholarly literature on land administration, integrating recent empirical contributions that point toward the wicked nature of land administration reforms.

Keywords: land reforms; wicked policy problems; Greece; Hellenic Cadastre System; conflict; complexity



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1. Introduction

Complex or intractable policy problems, often called “wicked” problems, have been a feature of public policy research since the early 1970s. Rittel and Webber [1] argued that systems analysis is no longer sufficient to tackle issues with a spatial dimension rationally, straightforwardly, and systematically. They espoused that scientists and engineers have traditionally focused on “tame” or “benign” problems. Tame problems may be solved using well-defined disciplines and specialties; only one actor is responsible for formulating policies to address them. A problem can be categorized as “tame” if it is clearly defined, or structured and standardized (quantitative) approaches and procedures are sufficient to tackle it. Technical approaches will not work, though, if a problem is poorly defined, “wicked” [1], “messy” [2], “ill-structured”, or “unstructured” [3,4]. Some problems have fuzzy boundaries, making distinguishing them from other issues difficult. Addressing the whole problem is more than addressing each of its parts. One cannot be sure what disciplines and specialties should be used to solve wicked problems while dealing with them. Conflicting facts and values are intertwined, and numerous actors participate in policymaking [5].

Similarly, land-related issues are politically contentious when on a large scale, as in the case of land reforms, making them difficult to deal with and implement [6]. Land

reform can broadly be classified into land redistribution (land transfer from large to small farmers) and land tenure or land administration reform (establishing secure and formalized property rights in land) [7–10]. Land administration theory's primary focus on developing, implementing, and monitoring cadastral systems to fulfill specified goals relies on scientific approaches in applied systems and the engineering paradigm, without emphasizing land reforms' complex (wicked) nature [11]. Nevertheless, land administration is about "humankind-to-land relationships" [12], which need to scale up efforts and integrate with other domains beyond legal and technical aspects [13]. Palmer et al. [6] argue that land reforms are inherently wicked, due to complex people-to-land relationships and their interrelation with the broader political, socioeconomic, cultural, and historical context. However, a systematic study of land reforms' wicked nature in the land administration literature is missing.

This paper argues that land administration reforms should be understood as wicked policy problems. We illustrate this claim by exploring the case of the Hellenic Land Administration Reform (hereafter HLAR or "the reform"). The HLAR is an entire overhaul of the country's land registry systems, with multiple components. It includes the development of the Hellenic Cadastre System (HCS), a digital parcel-based cadastral system to replace the deed paper-based land registry system, namely the Registrations and Mortgages System (RMS), and a paper parcel-based land registry system, the Dodecanese Cadastre (DC). It also includes, among other things, the introduction of legislative frameworks and their harmonization with existing ones until their complete replacement, the modernization of technical infrastructure, and the institutional reform of land administration organizations. Long-simmering problems in land governance, including informal land tenure patterns, inefficiency, and fragmentation in the various existing systems from different legal traditions, are intended to be addressed by this comprehensive reform. The HLAR seeks to establish a uniform and transparent digital system with modern digital services that could facilitate sustainable development and economic growth by radically altering Greece's land administration policy domain. It was initiated in the mid-1990s as a large-scale public infrastructure project, following the idea of the unified and evidentiary multi-purpose cadastre and the tradition of the Germanic family of land books [14–21].

The outset of Greece's Land Administration Reform in the mid-1990s, co-financed by the European Commission, concurred with other land administration initiatives in central eastern European countries under the thriving Europeanization influence and the flow of European structural funds [22]. The development of the new cadastral system in Greece, the HCS, which lies at the core of the HLAR, has been characterized as "so complex that no one dares to say let us make it simple" [23]. However, the reform's implementation suffered from complications common in ambitious public sector projects, e.g., a multiplicity of stakeholders with conflicting expectations, over-optimism, political interference, media scrutiny, rigid bureaucratic procedures or guidelines, and cumbersome policies [24]. Thus, little progress had been made till the onset of the sovereign debt crisis in 2009, which found the cadastral reform at a critical juncture following the successful completion of the third Community Support Framework co-financing cadastral mapping projects [25]. Greece's bailout programs of 2010, 2012, and 2015, along with the accompanying Memoranda of Understanding (MoUs) with its international lenders, prioritized the completion of the HCS by 2020.

In this paper, we follow an argumentative and conceptual approach. We reflect on the existing literature to show how the HLAR embodies the main traits of wicked problems, complexity, and conflict [26], which are regarded as pertinent due to the reform's ambitious scope, the actors' high level of divergence, and prolonged implementation. The sources were chosen based on their empirical insights into HLAR and their applicability to various

parts of the literature on wicked problems. Even though an analysis of the HLAR during the years of Greece's economic crisis is the main emphasis of this article, the tables in the paper include significant milestones up to the present day. This demonstrates a more comprehensive view that emphasizes the open-ended nature of the policy change, by highlighting how the crisis years paved the way for later developments, aligning with the relevant literature that demonstrates how crises serve as opportunities for reform [27–31].

Furthermore, this paper aims to advance the theoretical discussion on land administration reforms, stimulate further academic debates and research on policy responses, and provide insightful guidance for large-scale reforms in comparable contexts. To do so, we examine the associations between the characteristics of wicked problems [1] and the traits of land reforms [6] to illustrate the complexity and conflict inherent in land reforms, offering a novel approach in the contemporary land administration literature to enhance understanding of the wicked challenges and dilemmas [32] in land administration.

The paper is structured as follows: Section 2 reviews the literature on wicked policy problems, discusses what a wicked problem is and what the main characteristics of this type of problem are, and how they have been discussed in the literature on land reforms. In Section 3, we argue, based on recent research contributions [22,33,34], why the HLAR should be understood as a wicked policy problem by discussing the characteristics of the HLAR process and wicked problems. Finally, in Section 4, we summarize the paper's conclusion by reflecting on and contributing to the current understanding of the wicked nature of land administration reforms.

2. Literature Review

2.1. Wicked Problems: Origin, Definition, and Characteristics

"Hmm, those sound like "wicked problems"", responded West Churchman, University of California, after Horst Rittel's presentation on the differences between social and technical problems at the University of California, Berkeley, in 1967. The presentation was given in the context of a weekly seminar on these topics that West Churchman, a pioneer in groundbreaking operations research and system analysis work, organized following a NASA grant to investigate how technology from the space program could be applied to the world of urban problems [35]. Thus, Churchman's response and his first definition in a 1967 guest editorial in *Management Science*, credited to Horst Rittel, led to the genesis of the new field of wicked problems. These refer to «a class of social system problems which are ill formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing» [36] (p. B-141). Since then, when it first appeared in planning studies in the early 1970s, the concept of wicked problems has permeated many research disciplines.

The adjective "wicked" was initially intended to signify «the mischievous and even evil quality of these problems, where proposed "solutions" often turn out to be worse than the symptoms» [36] (p. B-141). The literature on wicked problems entails three broad categories of research agendas [37]. First, the concept itself [38–41]. Second, identifying a problem as wicked [42–45]. Third, how can a wicked problem be approached once it has been identified as such. This third category's literature stream emphasizes that in wicked policy problems, only imperfect, partial solutions or small wins are achievable in practice, and the significance of coordination and collaboration as a strategy for tackling wicked challenges and [26,46–54].

After the initial definition of wicked problems by Churchman, Rittel and Webber (1973) elaborated upon it and established the notion of wicked problems for which there are «no solutions in the sense of definitive and objective answers» [1] (p. 155). They distinguished between two types or classes of problems: “wicked problems” and “tame problems”. They did not choose the word “wicked” to imply that problems are morally repugnant or in any other way indicative of the morals or values of the society in which they arise. Instead, they define a problem as wicked when it is elusive or difficult to determine. It is influenced by several complex social and political elements, some of which are related to the process of addressing the problem to be solved. They make the point that depending on the viewpoints and beliefs of the individuals interested in the problem, the nature of the wicked problem is likely to be interpreted differently. In contrast, while undoubtedly complex and technically challenging problems in, e.g., mathematics and engineering, are “tame” to the extent that the problems themselves can be clearly defined (and solved) by experts who produce clear, practical solutions using analytical approaches from their disciplines. Rittel and Webber [1] identified the following ten characteristics of wicked problems:

- (1) There is no definite formulation of a wicked problem;
- (2) Wicked problems have no stopping rule;
- (3) Solutions to wicked problems are not true or false but good or bad;
- (4) There is no immediate or ultimate test of a solution to a wicked problem;
- (5) Every solution is essentially a “one-shot operation”; because there is no opportunity to learn by trial and error, every attempt counts significantly;
- (6) Wicked problems have no clear solution and perhaps not even a set of possible solutions;
- (7) Every wicked problem is essentially unique;
- (8) Every wicked problem can be considered to be a symptom of another problem;
- (9) There are multiple explanations for a wicked problem;
- (10) The planner (policymaker) has no right to be wrong.

Following the initial identification by [1], several authors have attempted to define the fundamental dimensions or properties of wicked problems [41,49,51,54,55]. Most scholars agree that they are fundamentally distinct from other, tame problems. Early scholarship on wicked problems highlighted the dimensions of complexity and conflict, which differentiate wicked from tame problems. Pava [56] connected ill-defined, complex problems with non-synoptic systems change. These are sociotechnical and non-synoptic, i.e., fragmented and piecemeal, systems characterized by high complexity and high conflict. The conflict between actors can range from low to high and arise from contrasting values. Diversity of viewpoints between different interests results from several factors, such as the number of actors involved and the level of their divergence. The conflict may concern the ultimate ends of change, the means of accomplishing it, or the initial definition of the problem itself. The complexity of the phenomenon requiring change ranges from low to high. Complexity increases in messy situations with many intertwined or unstable factors.

Pava [56] argues that a systematic change in behavior and values is required to effect change in non-synoptic sociotechnical systems characterized by high conflict and complexity. Papoulias and Tsoukas [57] developed a typology of problems related to social reforms, where conflict and complexity range from low, such as the case of rational planning (i.e., budgeting and forecasting), in which traditional operational research methods are appropriate, to high, such as ill-defined experimentation referring to a large-system change. In this case, high-conflict of social reforms reflects how diverse the values, viewpoints, and interests are among those affected by the reform, and refer to the reform’s goals, the means of implementation, or even the description of the problem the reform intends to solve. The

complexity of the issues involved in a reform depends on how tame a particular problem is. The more discrete, solid, and isolatable the problems the reform intends to remedy are, the more analyzable they will be.

Hisschemoller and Hoppe [5] present a typology of four different types of policy problems classified into two dimensions. One dimension relates to the degree of (lack of) certainty regarding the knowledge of an unsatisfactory situation and the methods for making it more desirable. The (lack of) agreement on values is the other dimension. When there is a high level of consensus and certainty, a problem is said to be structured or tame. Dissensus on values and uncertainty about knowledge makes the problem “wicked”, “messy”, “ill-structured”, or “unstructured”. Between tame and wicked problems are the moderately structured problems [5]. A few years later, Roberts [41] condensed Rittel and Webber’s (1973) wicked problem-related characteristics described above (1, 7, 8, and 9) and solution-related characteristics (2, 3, 4, 5, and 6) into just two dimensions: a lack of consensus on problem definitions, combined with a lack of consensus on solutions. Thus, three problems were identified: simple, complex, and wicked problems [41]. The high level of conflict among actors distinguishes wicked problems from simple and complex ones. There is no agreement on the problem or its solution in wicked problems. Head and Alford [49] succinctly contended that wicked problems are often related to societal heterogeneity (various interests and values of involved actors), institutional complexity (multi-level governance and inter-organizational overlapping), and scientific uncertainty (fragmentation and gaps in solid knowledge).

This section reviewed the origin, definition, main dimensions, and characteristics of wicked problems. In summary, it has been shown that there are two main dimensions of wicked problems: complexity and conflict. Since Rittel and Webber’s study, various fields of public policy, political science, and public management have made additional advancements in understanding complexity and conflict as characteristics of wicked problems. The ten features of wicked problems, as initially identified by Rittel and Webber [1], continue to rule the discussion despite many new insights. In the next section, we present how wickedness has been discussed in the literature of land administration by Palmer et al. [6] and enrich the discussion on how their work relates to Rittel and Webber’s properties.

2.2. *The Wickedness of Land Reforms*

Improving the effectiveness of a country’s land governance, which may directly target reforming its land administration system, is a complex, politically sensitive, and highly resistant-to-resolution endeavor [6]. Reforms may include transforming a country’s land administration system, which has been operational in its current form for a long time, or changing the organizations in charge of administering land, which entails changes to an organizational culture that has developed around the existing rules and procedures. Palmer et al. [6] argue that land reforms display the following traits: difficulty in defining the problem, a constantly evolving problem, lack of a clear solution, social and institutional complexity, and behavioral change being critical. Following this, we examine these traits, including examples of how aspects of these traits [6] are illustrated in case-specific land-related reforms, and we interrelate them with the characteristics of wicked policy problems [1]. The relationships identified below should be seen as a possible way of conceptualizing the interaction between the two sets of traits, rather than as a final or comprehensive classification, to provide a new perspective on how the features of land reforms correspond with the characteristics of wicked problems. Appendix A provides a complete reference for the visual depiction of these interrelations.

2.2.1. Difficulty in Defining the Problem

In land reform, there is difficulty in defining the problem clearly, since various actors have varying perceptions of the problem's nature, size, and scope. Each actor holds a puzzle piece, but none can see the entire picture alone. The available knowledge is fragmented among multiple actors, each holding some, but not all of that required to address the problem. Some information required to understand the problem may receive too much or too little attention because of how it is framed. The various actors may have interests (or values) that substantially conflict with those of other actors. Thus, different actors emphasize different parts of the problem and propose different solutions. Because of their differences in highlighting various aspects of the problem, there might not even be a complete, cohesive picture. Some proposals for solutions may have unanticipated effects, including detrimental effects on other system components; however, new opportunities may also emerge in this process. For instance, Almeida presented the complexity of a clear definition of the land-related issues in Timor-Leste, a country affected by post-colonialism, post-authoritarianism, and post-conflict challenges that the elected Timorese government faced after its independence: "The questions and their complexity were overwhelming" and "bringing justice to land-related grievances posed a very complex set of problems and dilemmas to the newly independent Timor-Leste" [58] (p. 135). In the case of formalizing property rights in informal settlements during South Africa's transition in the 1990s, the conflicting beliefs about land management, land administration, and the cadastral system were also apparent [59,60]. The slow pace of registration in the case of Romania's National Program of Systematic Land Registration was also attributed to a lack of a clearly defined problem and purpose [61].

The trait of difficulty defining the problem directly matches the characteristic that there is no definitive formulation of a wicked problem (1) [1]. It also relates to the lack of a clear solution (6) as a result of the weakness in defining the problem. The uniqueness of land-related issues pertinent to specific contexts relates this trait to every wicked problem being unique (7). Furthermore, given the path-dependent nature of land-related issues, the attempt to define the problem often reveals that these might be a symptom of another problem (8). In addition, the multi-stakeholder nature of land reforms contributes to the multiple explanations (9).

2.2.2. The Problem Is Constantly Evolving

Even if actors can agree on defining a land-related problem, the problem is constantly changing and evolving. The actors' comprehension of the problem may vary, since new aspects might emerge during implementation or new information might be generated. A political change could also open up and reveal fresh points of view; alliances and power dynamics may also vary over time. Vested interests adapt to reforms as well, coming up with new plans, ideas, or methods to protect the status quo or their interests. However, even if the problem is evolving, actors, political forces, resource availability, or a combination may determine the end of the design or land reform implementation for several reasons, including lack of resources and reform fatigue, among others [6]. A characteristic case of a constantly evolving problem is the policy reforms in East Africa and the West African Sahel to secure property rights in Africa's drylands. A new set of problems is created by policy initiatives to decentralize land allocation and administration to local governance levels and explicitly recognize and strengthen customary or group rights, such as, among others, the onset of a new round of resource user conflicts and the lack of accountability of local authorities [62]. The enduring reform process is also reflected in the case of Quebec's cadastral modernization program. In 1985, the project was initially evaluated at US\$55 million. However, six years later, "85% of the initial budget had been spent, but

the cadastre had been renewed for only 5% of Québec's 3.5 million properties" [63] (p. 3). The reform was suspended in 1991 and re-initiated in 1992 with "a 2006 completion target and an estimated budget of \$508 million" [64] (p. 182). Nevertheless, these estimates were updated again in 2005–2006, and a new deadline for the cadastre's completion was set for the year 2021, with a readjusted estimated cost of \$980 million [64].

Land reforms are characterized by their dynamic nature, given that new facets of the problem may come up during implementation, making a definitive formulation of land-related issues difficult. This aligns closely with several of Rittel and Webber's traits of wicked problems. First, there is no definite formulation of a problem, reflecting the constant redefinition of land reform challenges as new perspectives on the problem emerge (1). Second, the lack of a stopping rule (2) accentuates the iterative nature of land reforms, since advancements in one field frequently result in unforeseen challenges that call for additional interventions. Third, the characteristic that every wicked problem is essentially unique (7) relates to how land reforms have developed over the years in their specific sociopolitical and historical conditions, pointing out that there is no one-size-fits-all approach and that solutions cannot be replicated in other contexts. Fourth, the interdependencies of land-related issues often unveil deeper systemic problems (8). Addressing one aspect of the reform, such as land tenure, often reveals or aggravates other issues. Lastly, the evolving nature of land-related problems is due to the fact that each actor may frame the problem differently, or that actors' perspectives may shift over time, which aligns with the multiple explanations for a wicked policy problem (9).

2.2.3. Lack of a Clear Solution

Finding a clear solution is difficult when no clearly defined problem exists and the problem continually changes and evolves. Thus, actors may be forced to settle on "better", "worse", or "good enough" solutions in the absence of verifiably "right" or "wrong" solutions. Negotiations may lead to concessions that are not ideal, but the best that can be achieved at a given time. This could lead to the need for measures to "manage the problem" instead of "solving the problem". Without clear solutions, actors may struggle to persevere during the protracted reform process. Even when the problem continues, efforts to address it may end due to reform fatigue, changes or shifts in the political agenda or leadership, and a lack of resources [6]. A lack of a clear solution stemming from the "serious divergence" of the expectations among involved actors, such as the "producers (land surveyors), the users (government, ministries, landowners), the owners of the cadastre (the cadastral authorities) and the general public" was also encountered in Québec's initial phase of the cadastre reform [63] (p. 4).

What is considered a "good" or "bad" option in land reforms frequently depends on competing agendas and interests. Reforms aimed at formalizing land tenure, for example, may favor investors at the expense of local communities, resulting in controversial effects. This directly reflects Rittel and Webber's characteristic (3), which affirms that solutions are judged as "good" or "bad" rather than "true" or "false". Furthermore, the impacts of cadastral systems are frequently challenging to quantify, as their long-term outcomes unfold over decades and remain subject to debate. Therefore, this trait relates to the fact that there is no immediate or ultimate test for a solution (4). The high stakes of land interventions that affect property rights, where every attempt has significant repercussions, tie this trait to the characteristic (5). In addition, there is a direct match with Rittel and Webber's characteristic that wicked problems may lack a defined set of possible solutions (6). Last, policymakers have to be aware of and sensitive to decisions that might hike resistance, raise litigations, or induce other unforeseen consequences (10).

2.2.4. Social and Institutional Complexity

High levels of institutional complexity characterize land reform. A constellation of many co-competent organizations in the land sector often undermines reform efforts [6]. Competing sources of legitimacy and power are evident in the fragmented nature of the land sector. It often comprises a broad spectrum of governmental organizations, professionals, and civil society actors. State responsibilities are often split between numerous ministries and departments, posing unique reform hurdles. The coordination of many actors with multiple and frequently divergent interests over time is difficult and complex at best, and frequently impossible to sustain. The challenges at hand are far too complex and multifaceted for any single institution, no matter how large. Addressing a mess requires a multi- and inter-organizational reaction capability [65]. Paunescu and Paunescu [66] provide an account of the institutional complexity and weaknesses of Romania's land administration reform, resulting in poor and inconsistent coordination among local authorities, cadastral organizations, surveyors, and citizens and the slowing down of its progress. The institutional complexity of Romania's case and its path dependency is illustrated by Hernandez [67], who presented how Romania's land registration system in the early 2000s was managed by the different institutions of the Ministry of Justice (Land Books offices) and the regional offices of the National Cadastre Organization. Moreover, the Ministry of Agriculture was administering rural land reform, issuing property certificates to "newly defined private owners" [67] (p. 6).

Social complexity is inherent to land administration reforms, which challenge existing land tenure regimes through land titling formalization programs to build cadastral systems. The land tenure system consists of the rules governing how land is owned, used, managed, and transacted in a society [68]. It includes formal rules (e.g., laws and regulations) and informal rules (e.g., social norms and customs), which may not always align perfectly with each other. This dissonance creates a gap where social legitimacy (how people perceive and accept land rights) may not always match legal legitimacy (what is formally recognized by law).

Hull et al. [10], who studied various land reform theories and their impact on the success of reform initiatives in the cases of Southern Africa, Nigeria, and Mozambique, highlight that imposing formal land titling systems onto customary land tenure arrangements can lead to conflicts and unintended consequences; therefore, they call upon designing appropriate and context-sensitive land administration systems [10]. Similarly, Almeida [58] explored the limitations of legal approaches in addressing land grievances in Timor-Leste, how the introduction of formal land laws often overlooks the complexities of existing land tenure systems inherited during the Portuguese colonial era and Indonesian occupation, and the "disconnection between the law in the books, the work of the public administration and the practices on the ground" leading to 'wicked problems'—issues that are difficult to define and inherently unsolvable through "the linear thinking of the law" [58] (p. 146). The complex nexus between informality and the law in unauthorized settlements, a phenomenon not only visible in the Global South but also in other contexts in Southern Europe such as Italy [69], Greece, and Albania [70–72], and its implications in land-use regulation and planning (however, relevant to land administration reform efforts as well), has been studied by the authors of [73]. They propose considering the concept of *nomotropism*, which means "acting in light of rules" and not necessarily "in conformity with rules" in introducing regulations and institutional design, in "a sort of "goodness of fit" between the introduced rules and the larger context in which they are set" [73] (p. 166) so as to reduce the gap between their social and legal legitimacy.

Social and institutional complexity is related to difficulties in having a consensus on problem definitions and solutions for land reforms due to the involvement of multiple actors with competing interests. Thus, this trait is related to Rittel and Webber's wicked problem characteristic [1] that solutions to wicked problems are not true or false but good or bad (3), relying on the viewpoints of several actors and multiple explanations of the problem (9). Furthermore, every decision, action, or attempt in land reform "leaves "traces" that cannot be undone" [1] (p. 163) or might have unforeseen repercussions, damaging trust or intensifying disputes among the numerous actors. Therefore, land reforms should evolve cautiously, relating this trait with Rittel and Webber's characteristic that "every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial and error, every attempt counts significantly (5). The social and institutional complexity is also related to every wicked problem is essentially unique (7). Cultural norms, land tenure patterns and practices, legal frameworks, power dynamics, and political and historical aspects characterize the intrinsically distinct context in which land administration takes place. Therefore, solutions must be customized appropriately and cannot be readily transferred from one context to another.

2.2.5. Behavioral Change Is Critical

Palmer et al. [6] emphasize that behavioral change is critical in land sector reforms. They usually necessitate alterations to corporate culture, citizens' behavior, and land professionals' conduct. Land professionals may have established ideas regarding technical, legal, and procedural standards that make reform difficult. Moreover, the implementation of land administration reforms can be challenging for employees working in an environment with complex procedures. Their capacity to adapt to developments taking place on the ground may be restricted by donor requirements that are predicated on quick results [6]. This trait demonstrates the difficulty of modifying behaviors and embracing change. Such alteration in land surveyors' professional practices and activities, as well as the necessity to adapt to the new realities and complexities that emerged from the creation of a unified global cadastral map to replace single parcel-based paper maps, are evident in Quebec's cadastral reform, a program of "unprecedented scope, and unique in terms of methodology and final product characteristics" [64] (p. 181).

Solutions to land-related issues are evaluated based on their perceived effectiveness and fairness, with poor implementation requiring adaptation by involved actors to mitigate unintended consequences or modify the solution. Therefore, the trait of behavioral change [6] is related to Rittel and Webber's idea that solutions are not true or false, but good or bad (3). It is also related to every wicked problem being essentially unique (7). Land reforms take place in particular settings. Therefore, strategies to engage stakeholders to implement them should be adjusted to specific contexts, due to their unique institutional or cultural elements. In land sector reforms, actors' behavioral patterns are frequently linked to more general systemic problems like resource injustices, red tape, or ingrained power dynamics. Opposition to land reforms is often a sign of more serious, deep-rooted, and interrelated issues. To overcome these obstacles, it is frequently necessary to address the underlying systemic problems concurrently. Therefore, the importance of behavioral change is related to Rittel and Webber's characteristic that every wicked problem can be considered a symptom of another problem (8). It is also related to the characteristic that the planner (or policymaker) has no right to be wrong (10). Designing or implementing land reforms often entails risk and uncertainty. Therefore, policymakers must also adjust their behavior by being cautious in designing and making changes that might affect property rights and the people-to-land relationship, and thus result in opposition.

In this section, we presented some of the main challenges that are common in land administration reform efforts globally, linking the traits of land reforms as identified by the authors of [6] with the characteristics of wicked policy problems as identified by the authors of [1]. In the next section, we discuss the HLAR regarding the main traits of wicked policy problems, such as conflict and complexity, since they represent their key components, as described in the pertinent academic literature on wicked problems. Complexity reflects wicked problems' multifaceted nature, which includes interdependencies among different systems and actors involved, as well as institutional, legal, and technical hurdles. Another key characteristic of wicked problems is conflict. Conflict frequently stems from long-standing disagreements in the beliefs, objectives, and interests of the people impacted by a policy change and the definition of the problem or its resolution.

Although these issues are prevalent in land reform initiatives around the world, stemming from their multi-actor nature, institutional interdependencies, and long-term societal implications, the HLAR exemplifies how institutional, cultural, and political elements interact uniquely in Greece, and how these traits proliferated during the period of the economic crisis. The discussion section will provide a detailed analysis of these factors.

3. Discussion

The Hellenic Land Administration Reform has been a long and iterative process, reflecting the complexity and conflict inherent in the reform. To demonstrate the intricacy and iterative character of the HLAR, two separate tables are provided in Appendix B, compiled from secondary sources, highlighting both key legislative and policy milestones (Table A1) and the implementation progress of the HLAR (Table A2). This timeline of significant events illustrates how regulatory changes, institutional reorganization, and external impacts have all contributed to the reform's ever-shifting challenges and progress. While at the onset of the sovereign debt crisis in 2009, 17% of total property rights had been registered in the new HCS (6% of the total Greek territory), at the end of the crisis in early 2018, the figure increased to 28.7% of total property rights (7.8% of the area) (Table A2). The HLAR is currently in full expansion, following decisions and choices taken and milestones set during Greece's economic crisis.

3.1. Complexity

There are several approaches to explain why there is a distance between a problematic situation and what "ought to be". The type of problem-solving approach depends on the explanation selected [1]. In Greece, the lack of cadastre was explained as the cause of the encroachment on public lands, extensive informal development, deforestation, land speculation and cumbersome procedures in land transactions, expropriation, and property law. Thus, the solution prioritized in the mid-1990s was obtaining a cadastre and fulfilling a long-standing quest to "catch up" with the most advanced Western European democracies [33,74]. According to the predominant connotation, as applied in continental Europe, cadastres serve the state to facilitate the collection of land taxes, whereas legal land registries serve the needs of the citizens, to publicize conveyancing and land transactions [75–77].

The HLAR is characterized by structural complexity, visible in the intractability of the large-scale systems change that the reform entails: the transition from the Registrations and Mortgages System and the Dodecanese Cadastre and of diverse land tenure regimes to the Hellenic Cadastre System. Early discussions in the Greek domestic academic and professional legal discourse demonstrated a preference for the German system of land books [78,79], moving from the Napoleonic tradition of the person and paper-based Registration and Mortgages System, which had operated in the country since the mid-19th century. However, the actors who define the problem have the advantage of the first

move, which eliminates the attempts from other actors to redefine it [80]. Thus, it was the professional and academic community of the surveyors who put forward the development of the cadastre, which followed the most advanced cadastral exemplar in the mid-1990s: a parcel-based cadastral system, which would consist of a land registry and a cadastre component and would be digital and serve multiple needs, either for the benefit of the state or of the private vendees for securing and publicizing land transactions [20,33]. The initiation of the HLAR brought a paradigmatic change in the policy goals that a land registry system would serve: to reveal and protect public property; secure revenue from land taxation and land transactions; underpin spatial planning; support land policy; end state property encroachment and property disputes; and prevent informal development and deforestation [22].

Initiating a new land registry system from scratch (*ab initio*) in the mid-1990s signaled the prioritization of a solution with great inherent complexity. The onset of the reform had to put forward new organizations, IT infrastructure, procedures, and norms, and ultimately, the first cadastral registration process, the so-called adjudication process, implemented through outsourcing cadastral surveying projects to register property rights and classify private and public property. The latter necessitated delineating forests, forest lands, and seashores, which, according to national legislation, are considered predominantly public land. It also had to define how and which organizational entities would operate the new system, either at a final stage or in the intermediate period, and how they would gradually expand throughout the territory [33].

Head and Alford [49] demonstrated that institutional complexity, namely multi-level governance and overlapping responsibilities, characterizes wicked problems. Similarly, Palmer et al. [6] argue that institutional complexity is one aspect of reforms in the land sector. These reforms rarely fall neatly within the purview of any single organization, and this characteristic applies in the case of the HLAR. The HLAR evidenced complexity in the diversity and number of organizations involved. At the onset of the reform in the mid-1990s, the Hellenic Cadastre and Mapping Organization (HEMCO), a public legal entity established in 1986, was mandated to be responsible for operating the HCS at the final stage through its regional cadastral offices.

Furthermore, a more flexible private legal entity founded in 1995, namely KTIMATOLOGIO SA, would contract out the cadastral registration, i.e., the adjudication process. The output of the adjudication process, namely the first cadastral registrations, was assigned to be operated by the plethora of public, private, and notary-run mortgage offices supervised by the Ministry of Justice. The development of the HCS required collaboration with other competent authorities, such as the Forestry authorities, the Public Property authorities of the Ministry of Finance, the Ministry of the Environment, the local authorities, and the Ministry of Agriculture, among others [34].

As the HLAR proceeded and unfolded throughout the territory, new complications started to emerge, stemming from financial constraints, the technology required to be set up, the legacies of complex regimes of *de facto* land tenure, or the extended informality in Greece [70–72], along with the specific administrative capacity of the variety of institutions involved in implementing reforms [34]. Thus, the reform's scope or ambition level was impacted significantly over time, adjusting to the emerging complications and constraints.

From 2009 to 2018, during Greece's public debt crisis, the implementation of the HLAR within the overarching structural reforms that the Economic Adjustment Programs (EAPs) introduced was further complexified. The HLAR was associated with policy conditionality, encompassing a series of obligations with stringent deadlines [22,25]. As with other reforms that were included in the structural reforms of the EAPs, the HLAR had to fulfill specific requirements within specific deadlines to enable the release of the installments of the

bailout loans in a fragile economy [81]. Furthermore, collecting revenues from several sources, such as the privatization of public property, fees from property transactions, and real estate taxes was critical for the Greek government to satisfy urgent fiscal needs. Beyond the drastic fall of land transactions in the real estate market due to the economic recession, the old land registry system, namely the RMS, was suffering from the lack of an efficient, modern, and transparent mechanism for collecting land transactions fees directly to the public budget [22].

Institutional and procedural complexity were significantly exacerbated by overregulation in Greece's land administration policy domain, particularly during the economic crisis period (2009–2018). Balla et al. [22] argued that the reform process was characterized by the proliferation of laws, regulations, and organizational restructuring initiatives under intense external pressure and policy conditionality, with some of these responding to different goals. For instance, several legislative initiatives were undertaken during the period 2009–2018 to address the impact of the economic crisis on the operation of the RMS and the collection of land transaction fees [22]. Furthermore, the prioritized acceleration of the new HCS was aimed for, to secure fiscal revenue through the real estate tax as well as attract new investment, including foreign direct investment, by providing legal certainty regarding property rights in the real estate market. However, instead of incremental first-order changes to improve ineffective practices and services for citizens, the legislative overregulation in the policy domain was characterized by drastic second-order changes. For instance, too many significant changes to the land administration policy domain were included in the 4512/2018 Law to be implemented simultaneously. The 2018 statute is a noteworthy example of organizational change that affected the long-standing institutional field dispositions in which the land administration organizations were situated, by abolishing the National Cadastre and Mapping Organization (NCMA) and the almost 400 mortgage offices, either public, private, or notary-run, scattered around the country. Following this organizational change several repercussions, such as extreme delays in land transactions or in the operation of the newly formed public organization were identified. Earlier, in 2013, HEMCO was abolished, and some of its responsibilities were transferred to the KTIMATOLOGIO SA, which was renamed NCMA, reversing one of the initial policy choices at the onset of the reform in the mid-1990s [22].

Furthermore, institutional restructuring made things harder due to austerity measures for understaffed organizations, to provide efficient services, adding to their administrative costs. Employees suffered from reform fatigue since they had to balance competing agendas and follow an ever-growing list of procedural requirements. Overall, the legislative overregulation during the economic crisis is apparent in the six (6) legislative initiatives that have been undertaken affecting Greece's land administration organizations [22], without encountering other legislative initiatives inherent to the HLAR, such as for forest maps indicative of the complex nature of HLAR (Table A1, Appendix A).

3.2. Conflict

Conflict was a vital feature of the HLAR from its onset, between the two competing frames on the solution that was prioritized in the mid-1990s. On the one hand, it was the technical frame [82], as represented mainly by the policy community [83,84] of the Ministry of Environment and technical professionals, to push forward the solution of the HCS. On the other hand, it was the legal frame, as represented by the policy community of the Ministry of Justice and the legal professionals, such as the private registrars and occasionally the notaries, who were opposing the prioritized solution of a new cadastral system from scratch that would combine a legal and a spatial component and were proposing the preservation and modernization of the existing land registry system (RMS) and the creation

of a mapping infrastructure, to be distinctly supervised by the Ministry of the Environment. The predominance of the technical frame, which put forward the reform over the alternative solution that was promoted by the legal frame, induced a conflict between the actors of the new and the old system [34]. The conflict between these two frames, the legal and the technical, remained relatively moderate while the development of the new system, the HCS, was delayed in bringing results. Besides, the foundational cadastral law of 1998 ensured (article 23 L.2664) that the old RMS's principal actors, such as the registrars and the employees in the mortgage offices, would be operating the new cadastral system, the HCS, in the transition period, without any change to their employee status. Furthermore, the law ensured that at the final stage, the employees of the mortgage offices would be transferred to the cadastral offices to operate the new system. For the registrars, the 1998 law ensured accordingly that they could be appointed to the position of Head of the Cadastral Office, or if they did not wish to become employees in the cadastral offices, they could be appointed as notaries or lawyers [34].

The economic crisis onset at the end of 2009 opened a policy window [85]: the completion of the HCS fitted ideally as a solution to the challenges associated with the crisis and the EAPs' priorities. The promise of the new system to reveal public property and solve property disputes regarding public assets [86], was in alignment with the goal of reducing public debt through privatizations and the exploitation of public property. Furthermore, the promised increase in public revenues through a more transparent land registry system, which would facilitate the collection of land taxes and transaction fees, was consistent with the overarching goal of the EAPs to reduce the public deficit. Moreover, the formalization of property rights was appealing to resolve property disputes in private property, to boost economic development and attract foreign investments.

During the sovereign economic crisis, new actors came in with their own normative beliefs, preferences, and frames [82,87]. This contributed to increased opportunities for conflict in the reform process. Policy conditionality was accompanied by technical assistance to support the Greek government in the reforms associated with the MoUs. International actors had either an enforcement role (troika) or not (technical assistance). In this period, a new frame, the economic frame, as represented by the policy community of Greece's international lenders and foreign technical assistance, which prioritizes the new cadastral system as a solution to the country's move towards a new economic model and securing revenues for the country's fragile fiscal conditions, became apparent. Thus, the normative beliefs of foreign actors coincided with some local actors' normative beliefs and pursuits. They all prioritized the completion of the cadastre [34]. The acceleration of the HLAR, included in the EAPs from 2010 onwards, was aligned with the prioritized solution of the economic and technical frames to push forward the reform [34].

On the other hand, the interests of the various actors in the policy community of the legal frame were diverse. Private registrars of big private registry offices were consistently against the new system, while the registrars of small private registry offices were less resistant to the transition to the new system, which they had operated for many years during the transition phase, namely, the period in which both the old RMS and the new HCS were operated [25,34,88,89]. The employees of the private registry offices were eager to become public servants, thus leaving behind job insecurity. The employees of the public registry offices were unwilling to join the new cadastre organization, but to remain judicial public servants and be transferred to the Ministry of Justice or other related authorities, keeping their status [90,91]. Nevertheless, even if there were different perceptions of the means to implement the reform, finally there was an alignment in the last and most critical phase, to proceed with the implementation of the reform in a big bang approach

by contracting out the cadastral mapping in the rest of the country, and the organizational transformation [34].

The HLAR during the sovereign debt crisis occurred in the context of the country's structural adjustment, which was introduced with the bailout agreements and the associated economic adjustment programs, accompanied by policy conditionality [92,93]. The "normative isomorphic mimicry", in which organizations or countries adopt best practices, coincided with the "coercive" isomorphic mimicry, in which agents force isomorphism on an organization or country [94]. Undoubtedly, land tenure security, the promised outcome of the HLAR, ideally fitted the need for legal certainty on property rights. The latter has been included in the structural reforms driven by policies spawned by the Washington Consensus [95] and funded by international organizations like the International Monetary Fund (IMF) and the World Bank, to boost economic growth and enhance a country's competitiveness. Furthermore, foreign technical assistance in the cadastre domain encouraged the domestically nominated and prioritized perception that the lack of a cadastre constitutes a problem and advocated accelerating cadastral development and completion of the cadastral reform [34,96–101].

Nevertheless, policy conditionality and external empowerment [102] were decisive in bending any resistance towards the creation of one single organization to manage the country's land registry systems at the end of the period of the economic crisis, which would undertake the conversion and merging of the mortgage offices of the RMS and the cadastral offices of the DC into the creation of the final cadastral offices of the HCS, and the contracting out of the adjudication process in the rest of the country, when it was doubtful whether it would otherwise occur at that moment [22,34,103–106]. The sovereign debt crisis was a critical juncture [28,107] and functioned as an accelerator, based on the land administration's predominant discourse to push the reform process forward. Under extreme financial duress and policy conditionality, this kind of policy diffusion points to an interesting mixture of coercion and mimicry mechanisms [94,108–110].

In this section, we discussed the case of the HLAR through the lens of complexity and conflict, revealing the persistent and evolving challenges inherent in the reform process, which proliferated during the period of the country's economic crisis. The complexity of Greece's reform and its inherent conflict indicates the difficulty in implementing land administration reforms on a large, national scale, which involves multiple institutions and large numbers of people and resources [47], through radical shifts in existing land registry systems that aim to formalize diverse land tenure regimes fully. Nevertheless, as Palmer et al. [6] argue, land reforms have shown us that there is no quick fix. Building national consensus and support for land reforms takes time and money, and "if land reforms are rushed and under-resourced, they will be chaotic, incomplete, and ineffective" (p.33). Furthermore, these findings about Greece's land administration reform further align with the traits of third-order policy change [111], which similarly entails high levels of complexity and conflict, highlighting the intricate nature of such reforms. The following section concludes by highlighting the findings and suggesting directions for further study to deal with land administration reforms as wicked policy problems.

4. Conclusions

In this paper, we argued that land administration reforms should be understood as wicked policy problems. We used the HLAR as an appropriate case, and we analyzed aspects of the reform process through the lens of the main characteristics of a wicked problem. We found that the reform process, which entails, among others, transitioning from outdated land registration systems of different legal traditions to a unified, digital cadastral system, exhibits the characteristics of conflict and complexity, supporting our

claim that the HLAR should be seen as a wicked policy problem, not a technical or a tame one. The ambitious design of the reform, combined with pre-existing issues like fragmented and overlapping land administration responsibilities, conflicting actors' interests, and land tenure patterns, set the stage for its complexity. The economic crisis, which served as an opportunity to hasten the reform's endeavor, acted as a trigger that revealed and exacerbated latent complexities embedded in the reform's design and amplified political instability and resource constraints, increased conflict, accelerated rushing to solutions under crisis conditions, and favored large-scale interventions and reversals of initial policy choices, thus intensifying the inherent challenges of the reform.

By analyzing the HLAR within the theoretical framework of wicked problems, this study draws attention to the inherent resistance of land reforms to resolution, using linear or technocratic approaches. The paper contributes further to the current literature on land administration by offering a structured way to examine land reform processes through the associations between the characteristics of wicked problems by Rittel and Webber [1] and the wickedness of land reforms, as discussed by Palmer et al. [6]. The insights from this study may assist other jurisdictions in their efforts to achieve Sustainable Development Goal 1.4.2 through state-led land administration reforms. Future empirical studies are needed to validate and expand upon the current findings, due to their dependence on the authors' past empirical studies and the argumentative and conceptual approach of this paper. Further research could also incorporate comparative analyses with other countries' reforms to shed light on different approaches and techniques for addressing challenges in land administration and assessing their effectiveness. Exploring adaptive, participatory, transdisciplinary, and collaborative approaches, as well as iterative processes of experimentation and learning, may provide valuable insights for tackling the dynamic and contentious nature of land administration reforms [112–115]. These approaches, which emphasize small-scale interventions, tracking results, and developing adaptation plans based on emerging challenges and opportunities, could enhance the resilience and responsiveness of reform efforts. They also encourage collaborative problem solving, adaptive management, and focusing on the process rather than predefined outputs. By employing these tactics, reformers may achieve more sustainable and efficient methods for addressing the wicked nature of land administration reforms, acknowledging that such problems cannot be “solved” but only managed over time.

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Data Availability Statement: The data will be published in DANS Easy repository, and access can be granted by taking the ethical considerations and privacy restrictions into account.

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Appendix A. Conceptual Mapping of Land Reforms’ Traits and Wicked Problem Characteristics

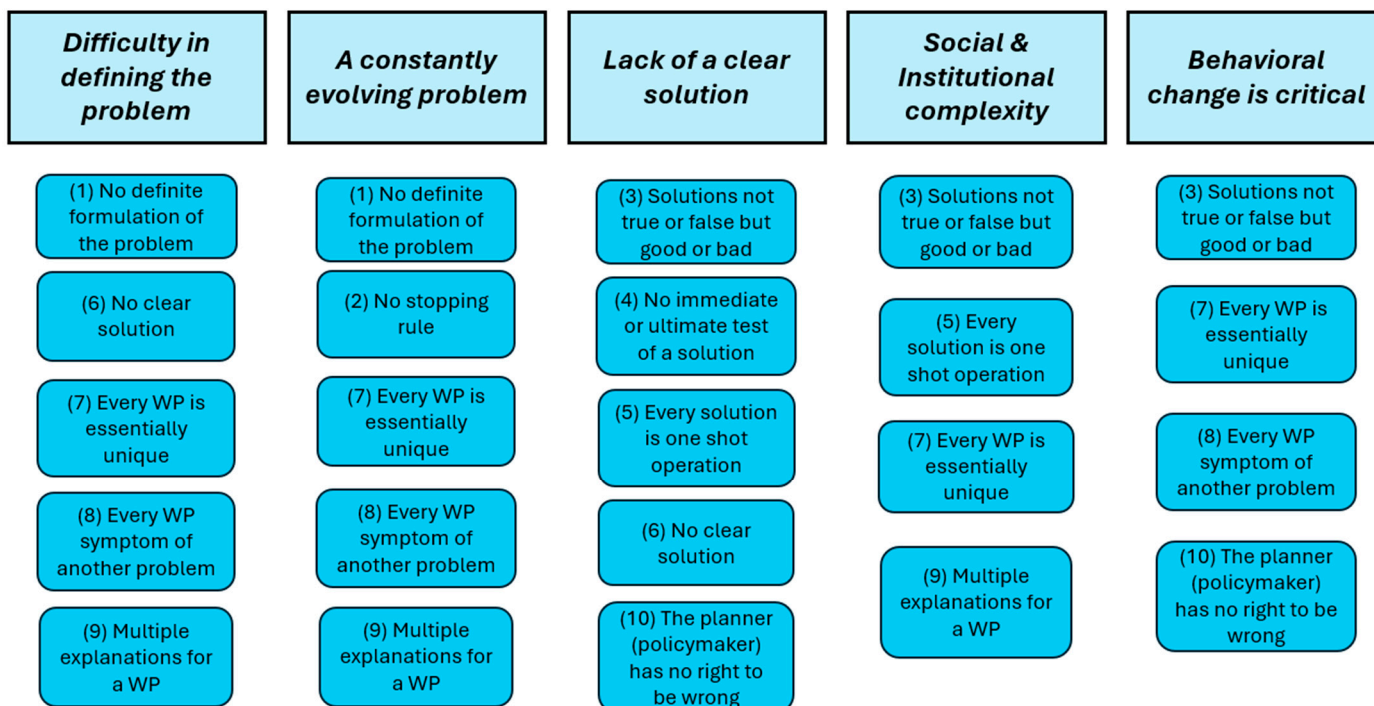


Figure A1. Relationships between Palmer et al.’s traits of land reforms and Rittel and Webber’s wicked problem characteristics. Note 1. This diagram illustrates the alignment (vertically) between Palmer et al.’s traits (upper level) and Rittel and Webber’s wicked problem characteristics, reflecting the authors’ interpretation. The numbers in parentheses correspond to the numbering of Rittel and Webber’s characteristics, as discussed in Section 2.1 in the text.

Appendix B. Tables

Table A1. Key legislative and policy milestones in the HLAR compiled by the authors based on multiple sources (See the list of sources below).

Year	Milestone	Significance
1995	Law 2308/1995	Foundational law providing the legal framework for the cadastral adjudication process.
1998	Law 2664/1998	Foundation law providing the legal framework for the operation of the Hellenic Cadastre System (HCS).
2001	Constitutional Amendment	Reinforced the mandate for establishing a comprehensive land and forestry registry system.
2010	1st EAP	Provided the acceleration of the reform and set the milestone for completion in 2020.
2010	Law 3889/2010	Provisions for the ratification of forest maps.

Table A1. Cont.

Year	Milestone	Significance
2012	2nd EAP	Provided, among others, the acceleration of the reform; strict deadlines for the validation of forest maps and delineation of coastal zones; tendered the cadastral projects in the rest of the country; streamlined property transfer procedures for tax purposes; and set the milestone for completion in 2020.
2013	Law 4164/2013	Abolition of HEMCO; simplification of procurement procedures.
2014	Law 4280/2014	Forestry Regulation Legislation (Chapter C).
2015	3rd EAP	Provided, among others, the adoption of a new legislative framework about forests and the preparation of forest maps; to set up a new organizational structure to operate the HCS; to proceed the cadastral registration in the rest of the country.
2016	Law 4389/2016	Accelerated forest map preparation, verification, and validation (Chapter Θ).
2018	Law 4512/2018	Established the framework for merging land administration organizations (of the HCS, RMS, and DC) (Chapter A).
	August 2018	End of Economic Adjustment Programs—Onset of Enhanced Surveillance (till 2022)—HLAR progress continued to be monitored by EU authorities.
2020	Law 4685/2020	Provisions for forest maps and unauthorized land-use changes in forests.
2021	Law 4821/2021	Acceleration of completion of the HCS; correction of first registrations; and licensed surveyors to update the cadastral maps.
	PD 3/2021	Transfer of responsibilities of the HELLENIC CADASTRE to the Ministry of Digital Governance
2022	Law 4915/2022	Regulates state ownership rights in land plots which have been afforested (Article 93).
	Law 4936/2022	Regulates state ownership rights in land plots that have been afforested in the cadastral registration process (Article 40).
	Law 4934/2022	Provision for the inclusion of the areas pertinent to DC in the HCS and harmonization of legal frameworks.
2023	Law 5076/2023	Acceleration of completion of the HCS; handling pending registering deeds to the HCS; strengthening operational capacity of the HELLENIC CADASTRE; and simplification and acceleration of property transfer.
2024	Law 5142/2024	Acceleration of cadastral registration to complete the HCS; simplification of procedures; introduced AI in land administration; provisions for the operation of the HELLENIC CADASTRE.
	Sources for Table A1	<ul style="list-style-type: none"> • Law 2308/1995, Government Gazette No. 114A/15.6.1995; • Law 2664/1998, Government Gazette No. 275A/03.12.1998; • Law 3889/2010, Government Gazette No. 182A/14.10.2020; • Law 4164/2013, Government Gazette No. 156A/09.07.2013; • Law 4280/2014, Government Gazette No. 159A/08.08.2014; • Law 4389/2016, Government Gazette No. 94A/27.05.2016; • Law 4512/2018, Government Gazette No. 5A/17.01.2018; • Law 4685/2020, Government Gazette No. 92A/07.05.2020; • PD 3/2021, Government Gazette No. 3A/06.01.2021; • Law 4821/2021, Government Gazette No. 134A/31.07.2021; • Law 4915/2022, Government Gazette No. 63A/24.03.2022; • Law 4934/2022, Government Gazette No. 100A/23.05.2022; • Law 4936/2022, Government Gazette No. 105A/27.05.2022; • Law 5076/2023, Government Gazette No. 207A/13.12.2023; • Law 5142/2024, Government Gazette No. 158A/04.10.2024; • Economic Adjustment Programs of Greece, European Commission.

Table A2. Progress of the HLAR (simplified) compiled by the authors based on multiple sources (See the list of sources below).

Year	Activity	Progress Achieved
1995–1999	Initiation of the first-generation cadastral pilot programs	Early groundwork for mapping and registration.
2008	Launch of second-generation cadastral projects	Accelerated cadastral registration in urban areas.
2009	Onset of crisis	Cadastral registration completed of 17% of total property rights—6% of the country’s area.
2011	Procurement of third-generation cadastral projects	Targeted ~18% of the country’s property rights (~26% of the area) in peri-urban and rural areas.
2016	Procurement of fourth-generation cadastral projects	Targeted ~42% of the country’s property rights (~63.4% of the area) covering an additional 4000 municipalities, including in rural and mountainous areas.
2019	EC co-funding of fourth-generation cadastral projects	Boosted progress with EC approval co-financing, with funds from the European Regional Development Fund (ERDF); cadastral registration completed ~33% of property rights (8,8% of the country’s area).
2021	Digitizing the mortgage offices’ registry books	Initiation of the project (procurement) to digitize registry books to enhance access to old land registry records and facilitate property transfer procedures.
2023	Accelerated efforts toward completing 100% cadastral coverage; organizational restructuring	Cadastral registration completed ~42% of property rights (15% of the country’s area); creation of 14 cadastral offices and 69 branches; forest maps validated for 88,5% of the total area.
2024		cadastral registration rate ~52% of total property rights at the end of 2024.
2025	Projected completion date of the adjudication process	Abolishment of ~390 mortgage offices and creation of 17 cadastral offices and 75 branches in January 2025; Aiming to achieve national cadastral registration by the end of 2025.

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